

Claims

1. Protective element for a breakwater or wave-retarding construction, comprising a body that has at least two projections (2, 3), characterised in that the body consists of a plate-shaped base (1), from the two plate sides of which the projections (2, 3) extend.

2. Protective element according to Claim 1, wherein the projections (2, 3) are in the middle of the base (1).

3. Protective element according to Claim 1 or 2, wherein the projections (2, 3) are in the extension of one another.

4. Protective element according to Claim 1, 2 or 3, wherein the projections (2, 3) are oriented perpendicularly with respect to the base (1).

5. Protective element according to one of the preceding claims, wherein the base (1) has at least one auxiliary projection (4) at the periphery, which auxiliary projection extends parallel to or in line with the base (1).

6. Protective element according to one of the preceding claims, wherein the periphery of the base (1) is non-circular.

7. Protective element according to Claim 6, wherein the periphery of the base (1) is square or rectangular.

8. Protective element according to one of Claims 1 - 6, wherein the periphery of the base (1) is polygonal.

9. Protective element according to Claim 8, wherein the periphery of the base (1) is a regular polygon.

10. Protective element according to Claim 7, 8 or 9, wherein there is an auxiliary projection (4) at each corner of the base (1).

11. Protective element according to one of the preceding claims, wherein the periphery of a projection (2, 3) is non-circular.

5 12. Protective element according to Claim 11, wherein the periphery of a projection (2, 3) is polygonal.

13. Protective element according to Claim 12, wherein the periphery of a projection (2, 3) is a regular polygon.

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14. Protective element according to preceding Claims 1 - 13, wherein both the periphery of the base (1) and of a projection (2, 3) is a regular polygon.

15 15. Protective element according to Claim 14, wherein a regular polygon, with n corner points, of a projection (2, 3) is of identical shape to a regular polygon of the base (1) and that the polygon of said projection (2, 3) is turned through the order of 360 divided by  $2n$  degrees of an arc with respect to the polygon of the base (1).

20 16. Protective element according to one of Claims 11 - 15, wherein the end of a projection terminates in a flat surface.

17. Protective element according to one of the preceding claims, wherein the material from which the element is made is concrete.

25 18. Protective element according to one of Claims 1 - 16, wherein the material from which the element is made comprises at least a residue material from oil refining, sand, rock-like granulate or gravel.

30 19. Protective element according to one of the preceding claims, wherein the base (1) has two parallel surfaces (8, 9).

20. Method for the production of a protective element according to one of the preceding claims, comprising the following steps:

- creating a first cavity (11) in a substrate (20) provided with shuttering (12) for a first projection (2),

- optionally pouring concrete into the first shuttering (12),

- creating a second shuttering (14) on the ground (10) above the first shuttering (12),

5 - pouring concrete (15) into the second shuttering (14) on the ground (10) and the previously poured concrete (13) for the first projection, or simultaneously pouring concrete (13) into the first shuttering (12) and pouring concrete (15) onto this and the ground in the second shuttering (14),

10 - allowing the quantity of concrete (15) in the second shuttering (14) to set to some extent,

- placing a third shuttering (16) on the concrete (15), set to some extent, within the second shuttering (14).

- pouring a quantity of concrete (17) into the third shuttering (16) to form the second projection.

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21. Method for the production of a protective element according to one of Claims 1 - 19, wherein the material at least consists of a residue material from oil refining, sand and rock-like granulate, comprising the following steps:

- separate production of base (1) and projections (2, 3) by:

20 - heating said material to above the melting point of the said residue material,

- pouring the material into a shuttering,

- allowing the material to set by allowing it to cool;

25 - locally heating the joining end of a projection (2, 3) at the same time as locally heating the base (1) at the joining location for said projection (2, 3) to above the melting point of the residue material,

- bringing said projection (2, 3) and the base (1) together at their joining location and then allowing the heated portion of the material to cool, as a result of which a permanent join is produced.

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22. Method for the production of a protective element according to one of Claims 1 - 19, comprising the following steps:

making a raised area on the ground (10) this area having a cross-section that corresponds to the cross-section of a bottom projection,

- fitting a split bottom box (21), which is open at the bottom and open at the top, on the raised area together with a split top box (22) connected to the bottom box (21),

- pouring the material for the element into the bottom box (21),

- allowing this material to set to some extent,

5 - pouring the material into the top box (22),

- allowing the material to set, after which the top box is moved upwards a short distance such that the top box is freed from the material,

- lowering the bottom box (21) a short distance, which is less than the distance travelled by the top box (22), such that the bottom box (21) is freed from the material,

10 - removing one half of the bottom box (23) with top box (25) and then the other half of the bottom box (24) with top box (26), after which bottom box (21) together with the top box (22) can be re-used for the production of a subsequent element.

23. Shuttering for the production of a protective element according to one of  
15 Claims 1 - 19, which consists of a bottom box (21) split in a vertical plane, with a left-hand bottom box (23) and a right-hand bottom box (24), and a top box (22) split in the same vertical plane and connected to the bottom box (21), wherein the bottom box is open at top and bottom and can be placed with the bottom over an elevation in a sealed manner and that the top box (22) is connected to the bottom box (21) by connecting elements, wherein  
20 lifting means are incorporated in said connecting elements so as to raise the top box (22) with respect to the bottom box (21) and wherein the bottom box (21) is supported by support means, for example mobile legs, which are provided with lifting means so as to lower the bottom box together with the top box.